Airborne Warning and Control Systems Program Office

Integrity - Service - Excellence

Lessons Learned from a Mature DMSMS Program

9th Annual Systems Engineering Conference

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Overview

- **Scope of Effort**
- **DMSMS Goals**
- **Lessons Learned**
- **Summary**

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Fleet Facts

- **Design:** **Modified Boeing 707/320**
- **Function:** **Airborne surveillance, command, control and communications (*High Demand*)**
- **Fleet Size:** **33 Aircraft (*Low Density - Small Fleet*)**
- **Age:** **30 years old**
- **Annual Hours:** **18,000**
- **Service Life:** **Extended to 2035+**
- **Community Partners:** **NATO 17, United Kingdom 7, Saudi Arabia 5, France 4, and Japan 4 Boeing 767 Aircraft**

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Vision and Mission

- **Vision - “To never have an AWACS E-3 become mission incapable due to the impact of DMSMS”**
- **Mission - “To develop and implement an integrated proactive DMSMS program in support of the AWACS Program Office”**
- **Goal - “Drive down Total Ownership Costs”**

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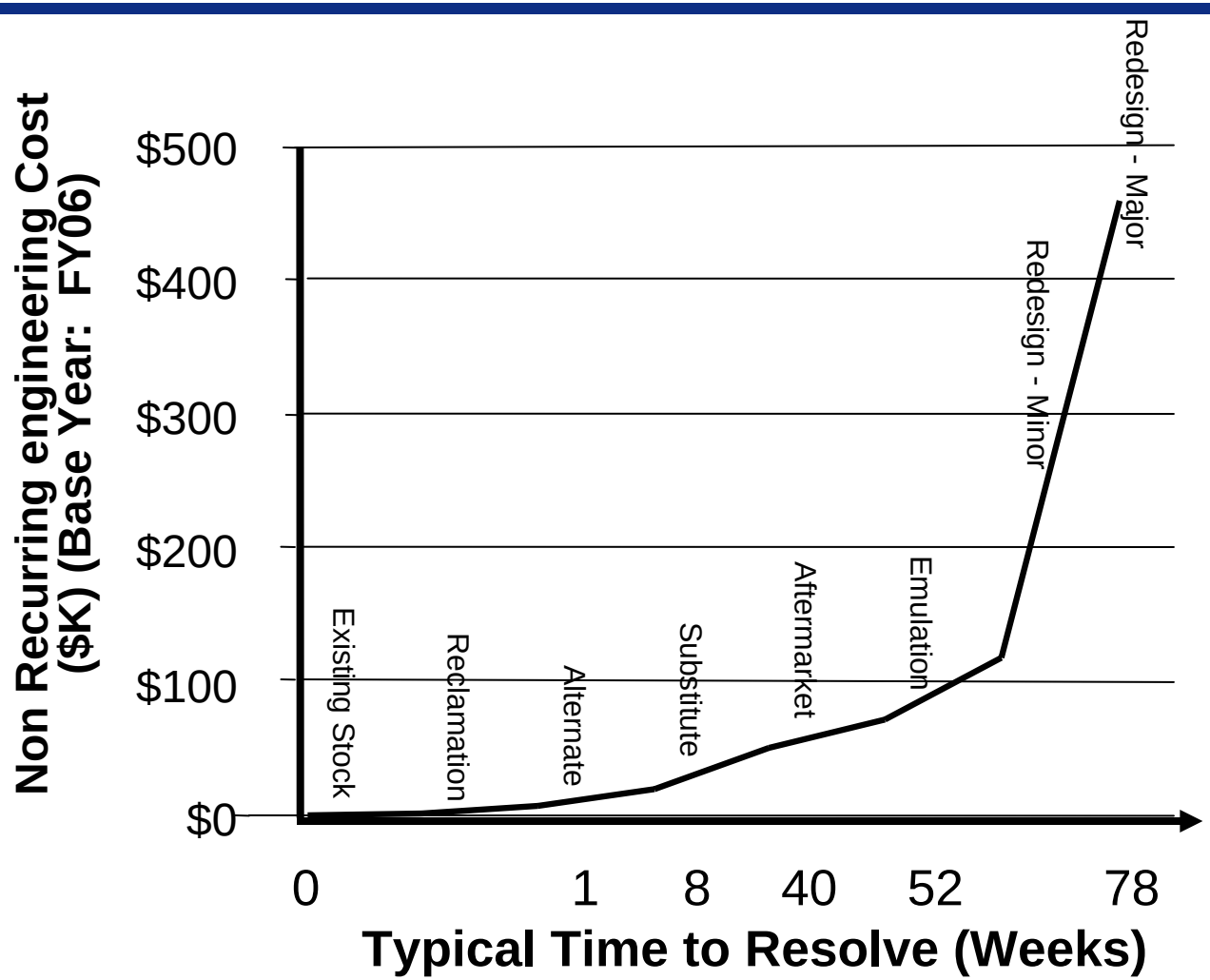
"Theoretical" Solutions – Cost and Time



Data Source: DMEA Cost Metrics

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Impact to AWACS

DMSMS Impacts all AWACS commodities

- **Air Frames**
  - **Cockpit, Fuselage, Leading Edge Panels and Doors**
- **Mechanical**
  - **Engines, Hydraulic, Landing Gear and Flight Controls**
- **Special Tooling and Jigs**
- **Avionics:**
  - **HF, VHF, UHF, Intercom, IFF and Emergency Comm**
- **AWACS Unique Equipment**
  - **Surveillance Radar, ESM IFF, etc.**

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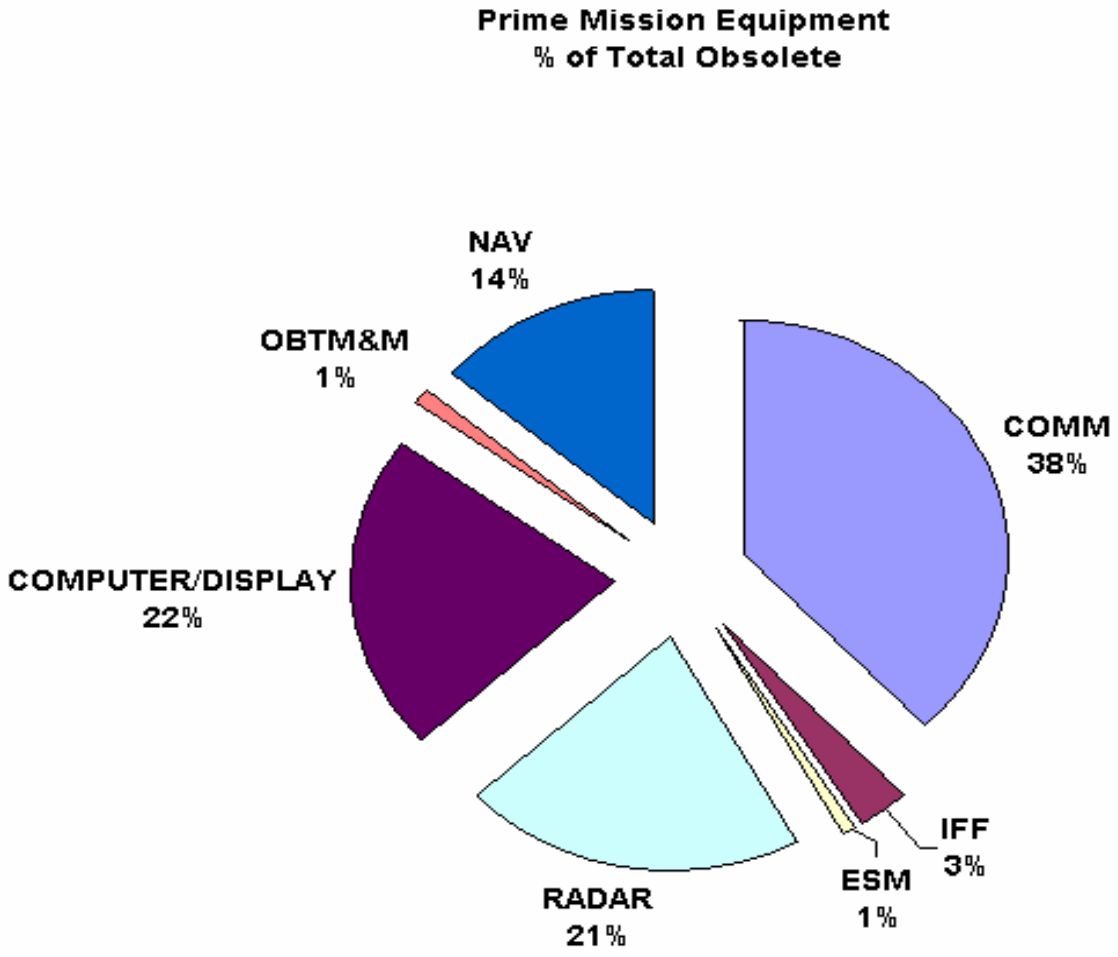
Prime Mission Equipment Obsolescence over next 6 years



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551 ELSG DMSMS Objectives

- Identify and capture existing aircraft configuration
- DMSMS focus on current issues and future mods
- Address present and future supportability concerns
- Preserve system and end-item OSS&E
- Coordinate and consolidate community efforts
- Integrate and implement resolutions *(recommendations)*
- Mitigate electronic and mechanical obsolescence
- Reduce both sustainment and development costs
- Institutionalize proactive DMSMS processes
  - Pinpoint end-item and system drivers to analyze
  - Track all DMSMS tasks (WG database)

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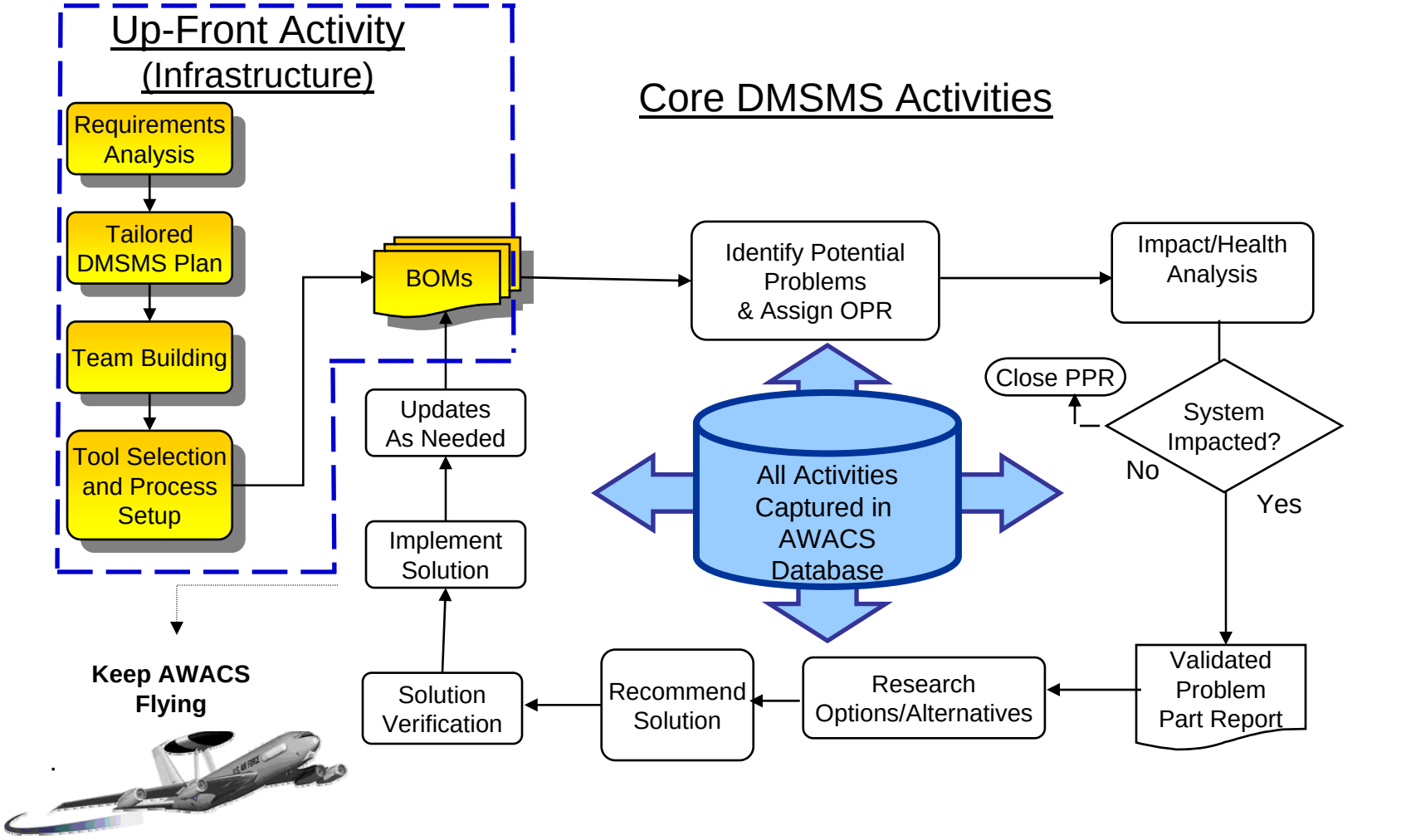
551st DMSMS Process Flow



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Operational Impact Analysis (OIA)*

MDS	Avg Operating Hours	Avg QPA	Avg App %
E003A		1	100
E003B	2715	1	100
E003C	1700	1	100

Part Number	Noun	NIIN	Initial QTY Spares	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
LRU																								
[redacted]	Air Speed Indicator	[redacted]	16	16	16	14	12	10	7	4	1	-2	-5	-8	-11	-15	-19	-23	-27	-31	-36	-41	-46	-51
				16900	17100	17000	16800	17100	17300	17300	17300	17300	17300	17300	17300	17300	17300	17300	17300	17300	17300	17300	17300	17300
SRUs																								
[redacted]	Bridge And Failure Monitor	[redacted]	3	2	0	-2	-4	-6	-9	-12	-15	-18	-21	-24	-27	-31	-35	-39	-43	-47	-52	-57	-62	-67
[redacted]	Amplifier And Modulator	[redacted]	2	2	1	0	-1	-2	-4	-5	-7	-8	-10	-11	-13	-15	-17	-19	-21	-23	-25	-28	-30	-33

*** The OIA is an ARINC Proprietary Tool**

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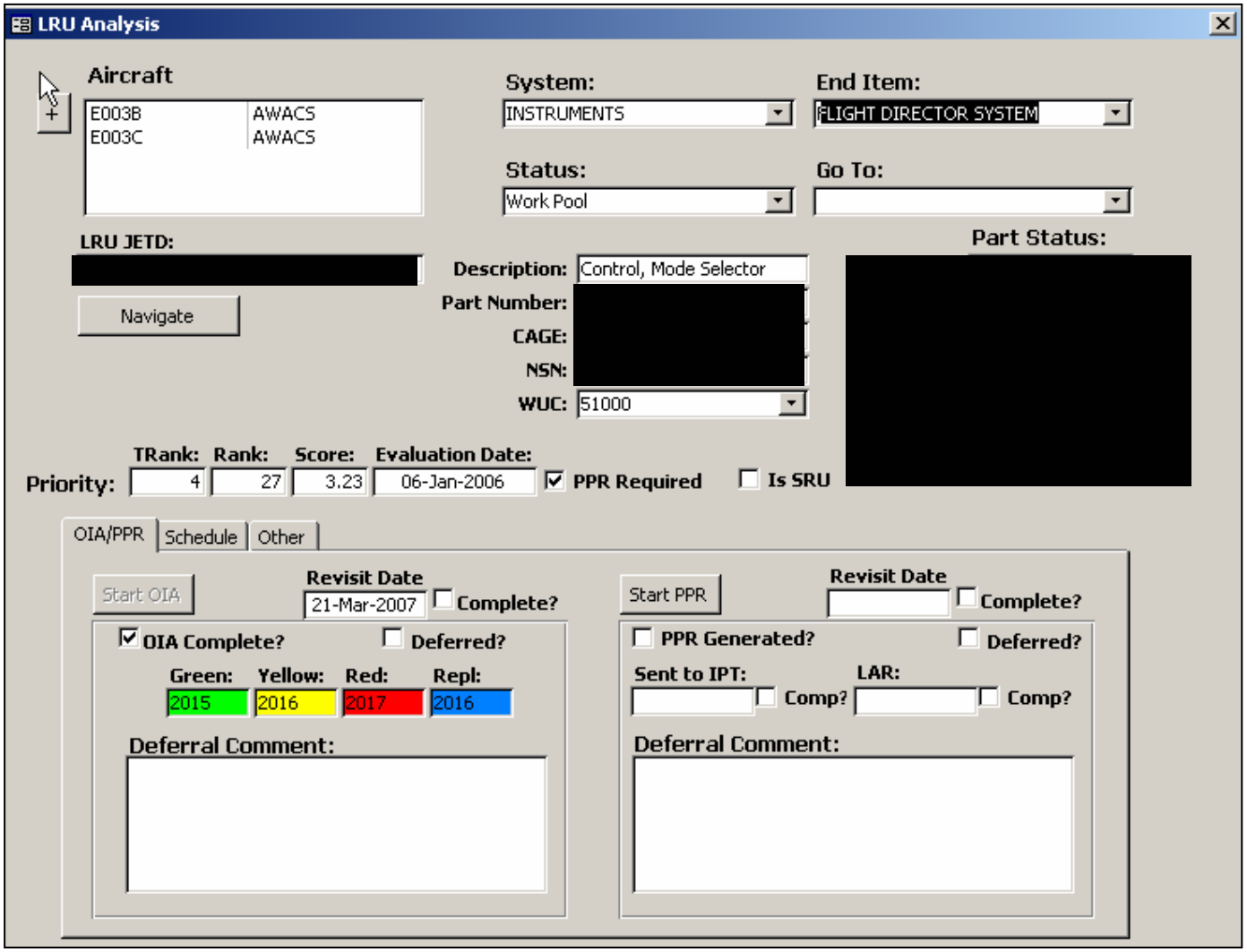
AWACS Priority Database



- SQL Database
- Stores
- Calculates
- Exports
- Schedules

*** The Priority Database is an ARINC Proprietary Tool**

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DMSMS Approach

LRU

SRU

Component

Problem Part Report

Summary Report

SE Review

Implementation

Drill down assembling and analyzing Logistics and Engineering data along the entire path

Roll up of all data points including resolution with costs comparisons

- Applicable drawing and its revision
- Type of drawing and item reviewed
- Configuration and design
- Next higher assembly and end item applicability
- Potential resolutions to the obsolete components

DMSMS WG

Engineering Authority

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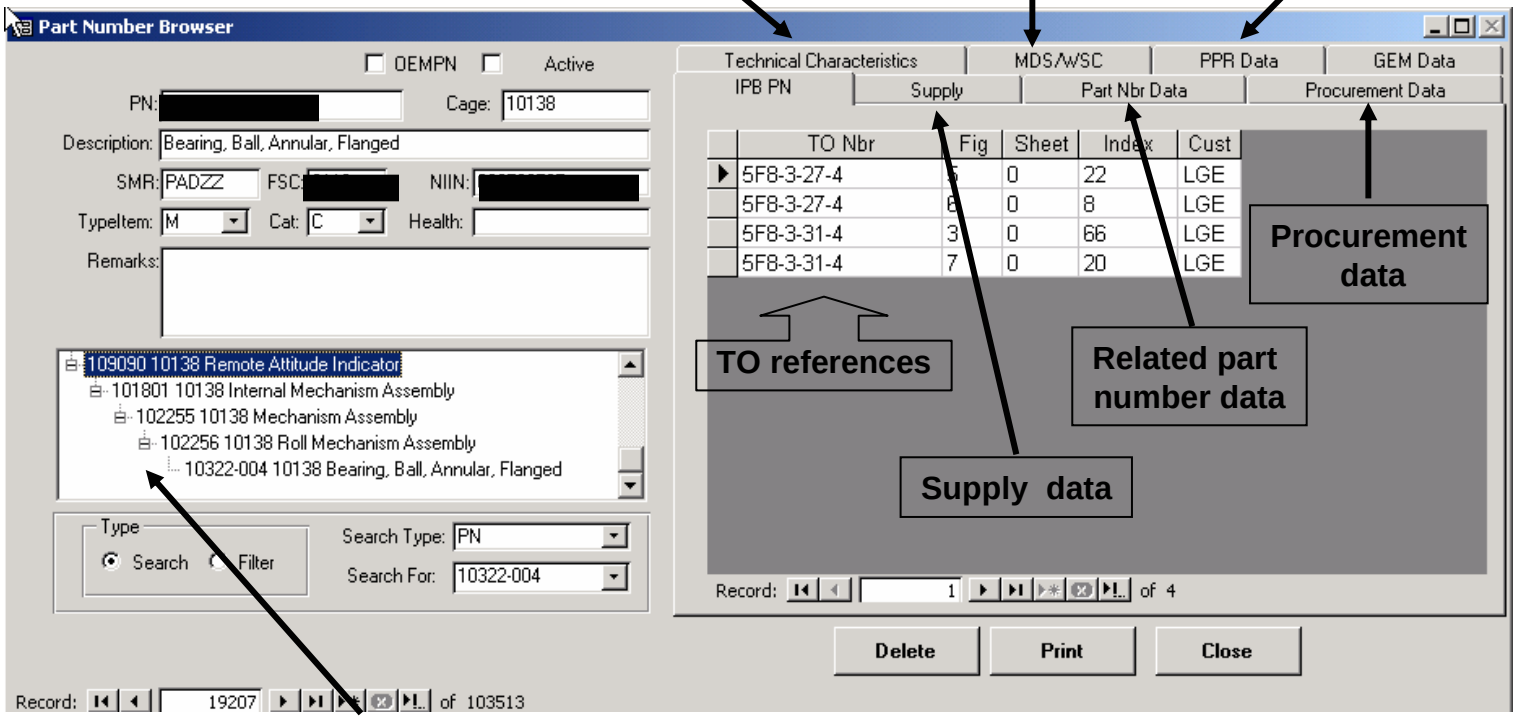
551st ELSG Data Repository

Aircraft/System application

Technical characteristics

PPR/Resolution data



Indenture Tree

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ALARM© Shapshot

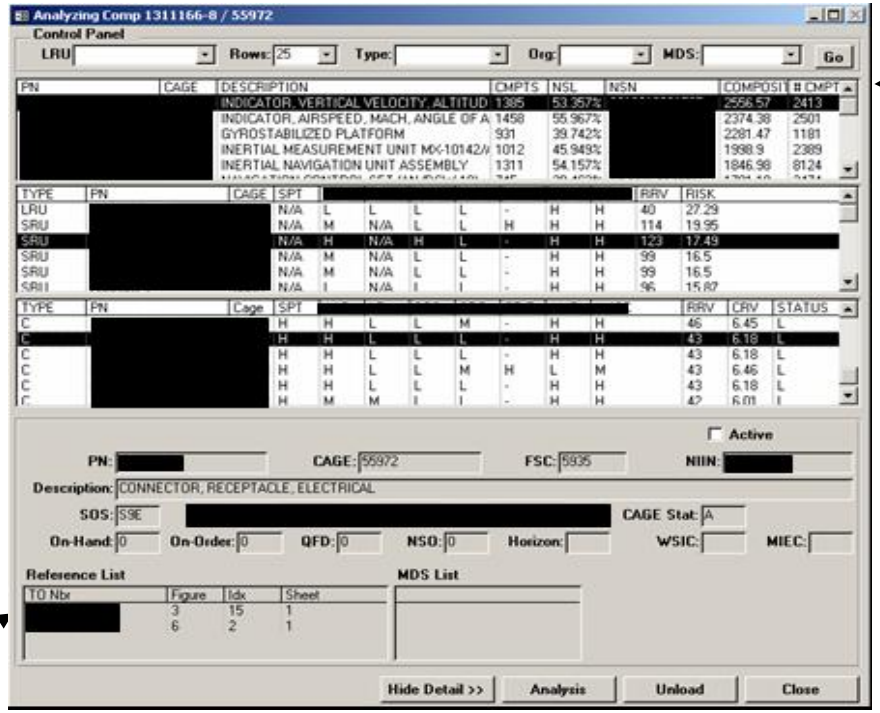
- **ARINC Process: Assess obsolescence characteristics of each component in an end item BOM, assign risk rating, roll up to LRU rating, and rank the LRU relative to other LRUs:**

LRU Individual Risk

SRU Individual Risk

Component Risk Associated With SRU (High Risk Only)

As you mine down from The first to the third list box, general information about the LRU/ SRU/ Component is displayed



LRU Rank Order by Composite Risk

Can be reported by:
- **Specified LRU**
- **Top 25, 50, 100**
- **Type (electronic vs. Mechanical)**
- **By organization within specified MDS**

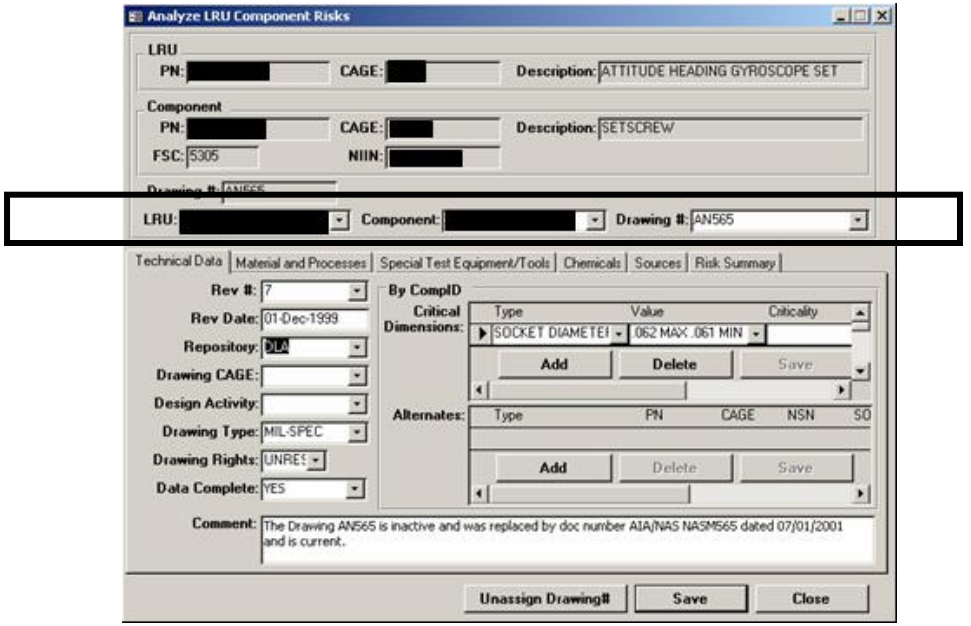
ALARM© Shapshot

- **ARINC Process**

Identify "High" risk component items and perform engineering assessment to determine unique component characteristics contributing to obsolescence risk:

- **Technical data completeness**
- **Special material and processes**
- **Special test equipment/tools**
- **Chemicals**
- **Sources**

Manual Process



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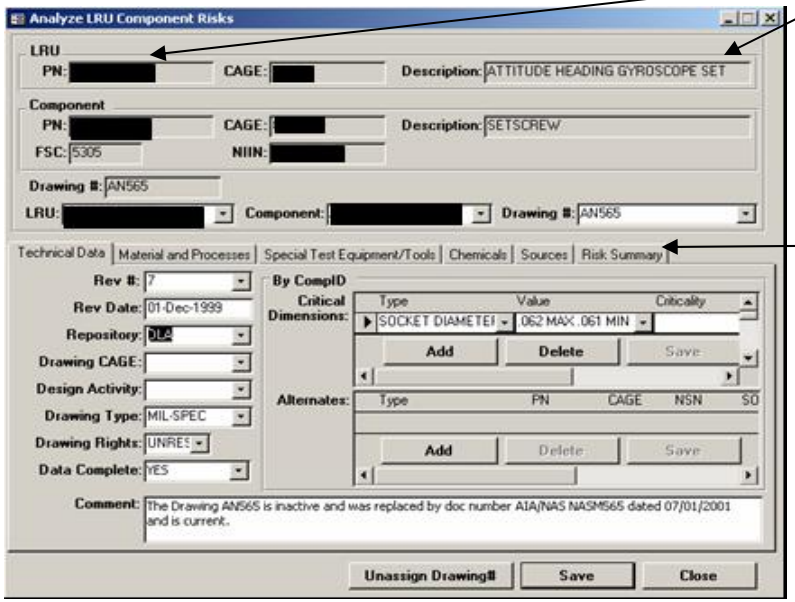
ALARM© Shapshot

- **ARINC Process**
  - **Create mechanical attribute library**
    - **Data availability**
    - **Applicable specifications/standards and their status**
    - **Tool availability**
    - **Banned chemicals**
    - **Sources no bid**



Data stored based on drawing, allows multiple PNs within drawing to be documented and retained

PN specific data stored separately

As library grows for each category of data, less information to manually document

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Lessons Learned

- **VHF radio**
  - **One of the first systems on which an evaluation a DMSMS was developed**
    - **Assumed configuration in predictive health tool was correct**
    - **Performed assessment even though OIA showed no support impacts up to 2024**
    - **Did not research if system was to be replaced**
  - **Learned configuration in predictive health tool did not include all SRUs (Over 20 CCAs not assessed)**
    - **Researched drawing data to extract correct configuration**
  - **Found out system was scheduled to be replaced in 2010**
  - **Changed process to include system manager in determining if DMSMS assessment required and when system was scheduled for replacement**

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Lessons Learned

- **Standardized Central Air Data Computer (SCADC) and UHF Radio**
  - **USAF program offices and FMS customers concerned that a new modified SCADC would not be supportable**
  - **UHF radio DMSMS issues raised by FMS community**
  - **DMSMS assessments initiated**
    - **OIAs for the SCADC and UHF radio showed that no obsolescence impact to mission support due to large number of spares in the supply system**
      - SCADC removed from decommissioned fleet (C-141, 2 per), and spares placed in inventory (over 400)
      - UHF radio inventory build up due to replacement of radio on some fleets
  - **Determined that even though obsolescence may adversely impact SRUs:**
    - **If enough LRU spares (serviceable and reparable) exist, obsolescence impacts are negated because cannibalization can support extended requirements**
    - **Use preliminary OIA to determine which LRUs to assess (if green through 2026 or green past replacement date, defer analysis**
  - **Must take supply chain into account versus only obsolescence data**

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Lessons Learned

- **Large Systems**
  - **Radar**
    - **Over NNN LRUs in the radar system**
    - **Top NN obsolescence LRUs in the radar**
    - **Inundated the engineering authority for the radar with proposed resolutions to obsolescence**
  - **Decision made to alternate between radar and other system LRUs**
  - **Otherwise could have spent entire contract period on a single system**
  - **Need to show DMSMS working for all stakeholders in the your community**

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Lessons Learned

- Data key to success
  - Configuration data
  - Technical Data
  - Market Surveys for COTS
- Teaming Required
  - MOAs mapped out and agreed upon
  - WG responsibilities defined
    - Due to differing DMSMS methodologies across user community
- Return on Investment (ROI)
  - None experienced without implementation of solutions
  - POM justification can be generated in proactive program
  - DMSMS focus on current issues and future mods
- Data points
  - Just a starting point…no one tool is enough
  - Prioritization…assessment of Supply Chain can focus resources
  - Focus on areas with greatest impact

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Lessons Learned

- **Proactive…Cost Avoidance growth per year**
  - **2003- $823,500**
  - **Resolutions- 153**
  - **ROI- 4.1 to 1**
  - **2004- $2.56M**
  - **Resolutions- 354**
  - **ROI- 5.6 to 1**
  - **2005- $3.80M**
  - **Resolutions- 184**
  - **ROI- 16.1 to 1**
  - **To date 2006- $2.96M**
  - **Resolutions- 146**
  - **ROI- 15.7 to 1**

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QUESTIONS